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REMARKS

As required by the Examiner, a new title has been submitted indicative of the claimed invention.

Claim 1 has been amended to set forth that the filtering means not only attenuates harmonic contents of the transmission signal but also has phase characteristics that increase the impedance to a sufficient value from the node between the antenna terminal and the second switching element toward the transmission terminal in the reception frequency band thereby substantially decreasing leakage of a reception signal toward the filtering means. For example, as shown in Figure 1 the filtering means (which combines filter 105 and phase-shift circuit 106) attenuates harmonic contents in the transmission signal from 102 and also has phase characteristics that increase the impedance to a sufficient value from the node between 107 and 108 towards the transmission terminal 102 (in the direction of arrow 107a shown in enclosed annotated Fig. 1) in the frequency reception band and in this way to substantially decrease leakage of a reception or received signal.

I. Response to Rejection of Claims 1, 3, 4, 6 and 7 under 35 U.S.C. §103

The Examiner combines Shimo (U. S. Patent 5,193,218) in view of Kang (U.S. Patent 6,034,990) to reject claims 1, 4 and 7. As the Examiner concedes "Shimo does not disclose filter means inserted between the first switching element and antenna terminal and filtering means attenuating harmonic contents and phase characteristics which increase the impedance".

The Examiner further states that Kang does disclose filter means (52) inserted between first switching element (45) and antenna terminal (10) shown in Fig. 2, and filtering means (52) attenuating harmonic contents and phase characteristics which increase the impedance. The Applicant respectfully submits that filtering means (52) in both Fig. 1 and Fig. 2 of Kang does not have the function to increase impedance. In column 4, lines 19-22 Kang describes the function of Low Pass Filter "LPF" (52) to provide low-pass filtering to eliminate harmonic components but not increase impedance and decrease leakage of a reception signal as set forth in claim 1 as amended. Specifically, amended claim 1 sets forth that the filtering means has phase characteristics that increase the impedance to a sufficient value to substantially decrease leakage of the reception signal toward the filtering means (in the direction of arrow 107a in annotated Fig. 1) with switch 108 closed and switch 104 open.

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The Examiner further states that Kang describes a Quad tank 28 to phase control an output of limit amplifier "LA" 24 by 90 degrees at column 4, lines 52-56. Applicant contends that the Quad tank 28 functions to merely shift the phase 90 degrees for demodulating and eliminating the radio frequency carrier. Quad tank 28 does not have phase characteristics to increase impedance to a sufficient value to substantially decrease leakage of the reception signal towards the filtering means as now set forth in amended claim 1.

Applicant further defines that filtering means (105 and 106) is disposed between the first switching element 104, for example, and antenna terminal 107 since claim 1 requires that switch 104 is between transmission terminal 102 and antenna terminal 107. This is entirely different from Kang in which Quad tank is disposed in a locked loop modulation section as set forth at column 5, lines 10-11 and not between switching element 45 and antenna terminal 10 in Fig 2 of Kang. Therefore combining Shimo and Kang does not provide Applicant's invention as now set forth in amended claim 1.

New claim 8 has been added to emphasize that the filter has phase characteristics that provides the impedance from node 107 (Fig. 1) or node 209 (Fig. 2) toward the transmission terminal 102 or 202 in the reception frequency bank of a sufficiently high value.

II. Response to Rejection of Claims 2 and 5 Under 35 U.S.C. §103

The Examiner combines Shimo, Kang and Kitakubo (U.S. Patent 5,822,684) to reject claims 2 and 5. As the Examiner concedes, Shimo fails to disclose filter means to attenuate harmonic contents and the phase characteristics to increase the impedance.

The Examiner further states that Kitakubo discloses filter means (6) to attenuate harmonic contents and phase characteristics (5) to increase the impedance as shown in Figure 1 and in column 1 lines 29-34. Applicant contends that Figure 1 and column 1 lines 29-34 of Kitakubo only disclose the arrangement of a band-pass filter, a phase shifter and an antenna. Kitakubo merely discloses the function of the band-pass filter in column 1 lines 35-47. Kitakubo uses band-pass filter 2 to select the transmit signal STX and block (control) the receive signal SRX. On the other hand, band-pass filter 6 only allows receive signal SRX to pass and stops the transmit signal STX. Therefore band-pass filter 2 and band-pass filter 6 work together as switches in the duplexer circuit. Applicant contends that Kitakubo does not and could not teach using filter means to attenuate harmonic contents resulted from the non linearity of the switching element because the filter itself in Kitakubo is the switching element.



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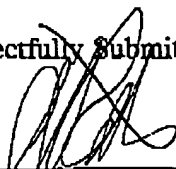
Therefore there is no suggestion in any of the references to combine them to somehow achieve Applicants' structure and function as set forth in amended claim 1.

Amended claim 2 is dependent on amended claim 1 and further specifies the phase shifter performs phase adjustment on the basis of the phase characteristics according to the amount of phase shift caused by said filter. While Kitakubo discloses a phase shifter that improves impedance by adjusting the phase there is no suggestion that the phase adjustment is based on the phase characteristics according to the amount of phase shift caused by the filter, nor do other two references.

Request for Acknowledgement of Foreign Priority

It is respectfully requested that the Examiner acknowledge receipt of certified copies of the priority documents filed October 22, 1999 together with the original filing of this application.

Respectfully Submitted,



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Enclosures: Version with markings to show changes made

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VERSION WITH MARKINGS TO SHOW CHANGES MADECLAIMS:

- 1 1. (Amended) A transmitting/receiving switch comprising:
- 2 an antenna terminal connected to an antenna;
- 3 a transmission terminal connected to a transmission circuit;
- 4 a reception terminal connected to a reception circuit;
- 5 a first switching element that turns on or off the connection between said antenna
- 6 terminal and said transmission terminal;
- 7 a second switching element that turns on or off the connection between said antenna
- 8 terminal and said reception terminal; and
- 9 filtering means inserted between said first switching element and said antenna terminal,
- 10 wherein said filtering means (1) attenuates harmonic contents in a [the] transmission
- 11 signal and (2) has phase characteristics that increase the impedance to a sufficient value from
- 12 the node between said antenna terminal and said second switching element toward said
- 13 transmission terminal in a [the] reception frequency band, thereby substantially decreasing
- 14 leakage of a reception signal toward said filtering means.
- 1 2. (Amended) The transmitting/receiving switch as set forth in claim 1, wherein
- 2 said filtering means comprises:
- 3 a filter that attenuates harmonic contents in said transmission signal, said harmonic
- 4 contents resulting from said first switching element; and
- 5 a phase shift circuit that performs phase adjustment on the basis of said phase
- 6 characteristics according to the amount of phase shift caused by said filter.

Claim 8 has been added.

